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215 feet in altitude. At this lower level an hydraulic motor pump is installed. This is constructed very much like an ordinary steam pump, except that the steam cylinders are replaced by water cylinders, forming the motor. The pipe last described divides into two branches just above the pump. One of these connects with the motor end of the pump and the other with the pumping end. The piston areas for the two motor cylinders are sixfold greater than the areas of the pumping pistons. The large motor pistons, operated by six gallons of water with 215 feet head, enable the small pumping pistons to lift one gallon through the 2,100 feet of two-inch pipe to the Kepler reservoirs, 895 feet in altitude above the pump. In other words, the pump places one gallon in seven in the Kepler reservoirs, the other six gallons doing the work. The simple device of dividing the power pipe just above the pump so as to supply water to the pump-end under a pressure of 215 feet, increases the efficiency of the pumping system to this extent.

The only personal attention required by the pump consists in filling the oil cups once a week. The pump was constructed by the Dow Pumping Engine Works, San Francisco, under the guarantee that it would do the work described.

At the present time the pump is delivering 6,200 gallons per day to the Kepler reservoirs. Our average daily consumption throughout the year is about 1,700 gallons. It is expected that one gallon in seven during the late summer and fall months will deliver about 1,200 gallons per day. With the 200,000 gallons stored in the Kepler reservoirs, and with the Aquarius pumping system available in case of need, it is believed that our annual anxiety as to the water supply will be eliminated. During the dry season the available water supply will be three- or fourfold greater than it has been in the past.

An electric pumping plant is replacing the steam plant at Aquarius.

W. W. Campbell.

Mt. Hamilton, March 25, 1907.

Note on Comet *a* 1907 (Giacobini).

The first comet of this year was discovered close to opposition, March 9th, by Giacobini, at Nice. From the first three available observations (March 9th, by Giacobini, at Nice; March 11th, by Rice, at Washington; March 12th, by Fath, at Mt. Hamilton) a preliminary orbit was computed. The elements and ephemeris are given in *Lick Observatory Bulletin,* No. 111.

Dr. AITKEN states that "the comet as seen here on the first date was very small, round, with well-marked condensation, and almost equal to an eleventh-magnitude star in brightness." It is now receding from the Earth.

The observations are satisfied by a parabola. The comet has a retrograde motion, the plane of its orbit having an inclination of 142° to the ecliptic. Its nearest approach to the Sun was on March 12th, at which time it was 190,000,000 miles, or 2.05 astronomical units from it. The longitude of perihelion is 50°; the longitude of the ascending node is 96°.

Having no later observations from the East, and not having one from Mt. Hamilton because of the position of the Moon and the continual rain in California, it has been so far impossible to obtain a second orbit.

STURLA EINARSON.
ESTELLE GLANCY.

BERKELEY ASTRONOMICAL DEPARTMENT, March 27, 1907.

NOTE ON COMET *b* 1906 (KOPFF).

This comet was discovered in March, 1906, by KOPFF, at Heidelberg. Its geocentric motion was very small. From a twenty-two-day arc a set of parabolic elements was computed by Mr. CHAMPREUX and myself and published with an ephemeris in *Lick Observatory Bulletin,* No. 97. The remarkable feature of the orbit is the great perihelion distance, 3.3 astronomical units. Because of its great distance from the Sun its heliocentric motion in the last year has been but 50°. The Earth has therefore overtaken the comet, and it was picked up again March 21st of this year by KOPFF. The residuals for this place from our orbit are (O–C) $\Delta\alpha = -0^\circ.6$; $\Delta\delta = +0^\circ.1$. A change of about eight days in the time of perihelion passage will remove the greatest part of these. No attempt will be made to improve these elements on the basis of this year's observation since Professor WEISS has found and published in *A. N.* 4154 a set of elements and ephemeris which represent this place almost exactly. WEISS's elements have been deduced from observations extending from January, 1905, to May, 1906. The position of January, 1905, is from a